Alpha Magnetic Spectrometer - 02 (AMS-02)
AMS Rebaselining Outbrief

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Operations Overview

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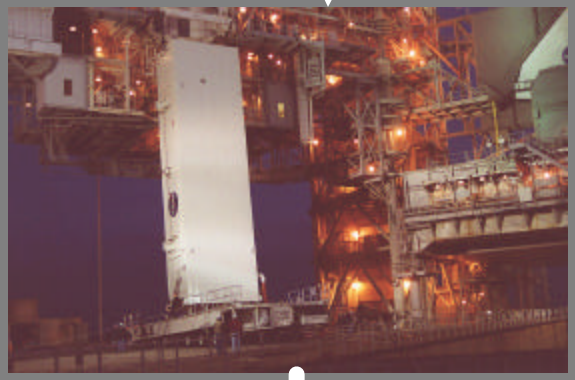
Kennedy Space Center Flow

- Arrive at Multi-Purpose Payload Facility (MPPF)
- Integrate AMS
- Top-off SFHe and TRD Gas Supply
- Power up/checkout Avionics and Charge Magnet (note: UPS is always charging when power is applied to PDS)
- Discharge Magnet and Power off all systems
- Package and transport to Space Station Processing Facility (SSPF)
- Integrated Verification Test in Launch Processing Integration Stand (LPIS) and PTCS
- Power up/checkout avionics, no Magnet Charge

Kennedy Space Center Flow (Cont.)

- Load into canister and transport to Canister Rotation Facility (CRF)
- Rotate canister in CRF
- Transport to Pad for Vertical Installation
- End to End Test in STS



Prelaunch Operations Profile

- T_0 Umbilical requirements
  - – Vent Pump, Cryocoolers, valves, CAB critical monitoring functions, and J-Crate
    - » Power (120 Vdc) to PDS
    - » Direct feed to Vent Pump
    - » 1553 for command/telemetry requirements
      - AMS provided GSE with network connection located in Room 10 of Mobile Launch Platform (MLP) to interface with AMS and AMS GSE in on-line facility at KSC
      - Serves as 1553 Bus Controller when OIU not enabled
    - » Required continuously until L-9 min to monitor health status of Cryo systems (Vacuum Case pressure and SFHe pressure/temp)

Prelaunch Operations Profile (Cont.)

- T_0 Umbilical requirements (Continued)
  - Remainder of experiment avionics
    - » High Rate Data via RS422
      - Can be used as command/data interface if problem with 1553
      - AMS provided GSE in Room 10 of MLP serving DDRS-2 functions
      - GSE interfaces with AMS and AMS GSE located in on-line facility at KSC via network connection
    - » Required only for calibration and contingency troubleshooting operations

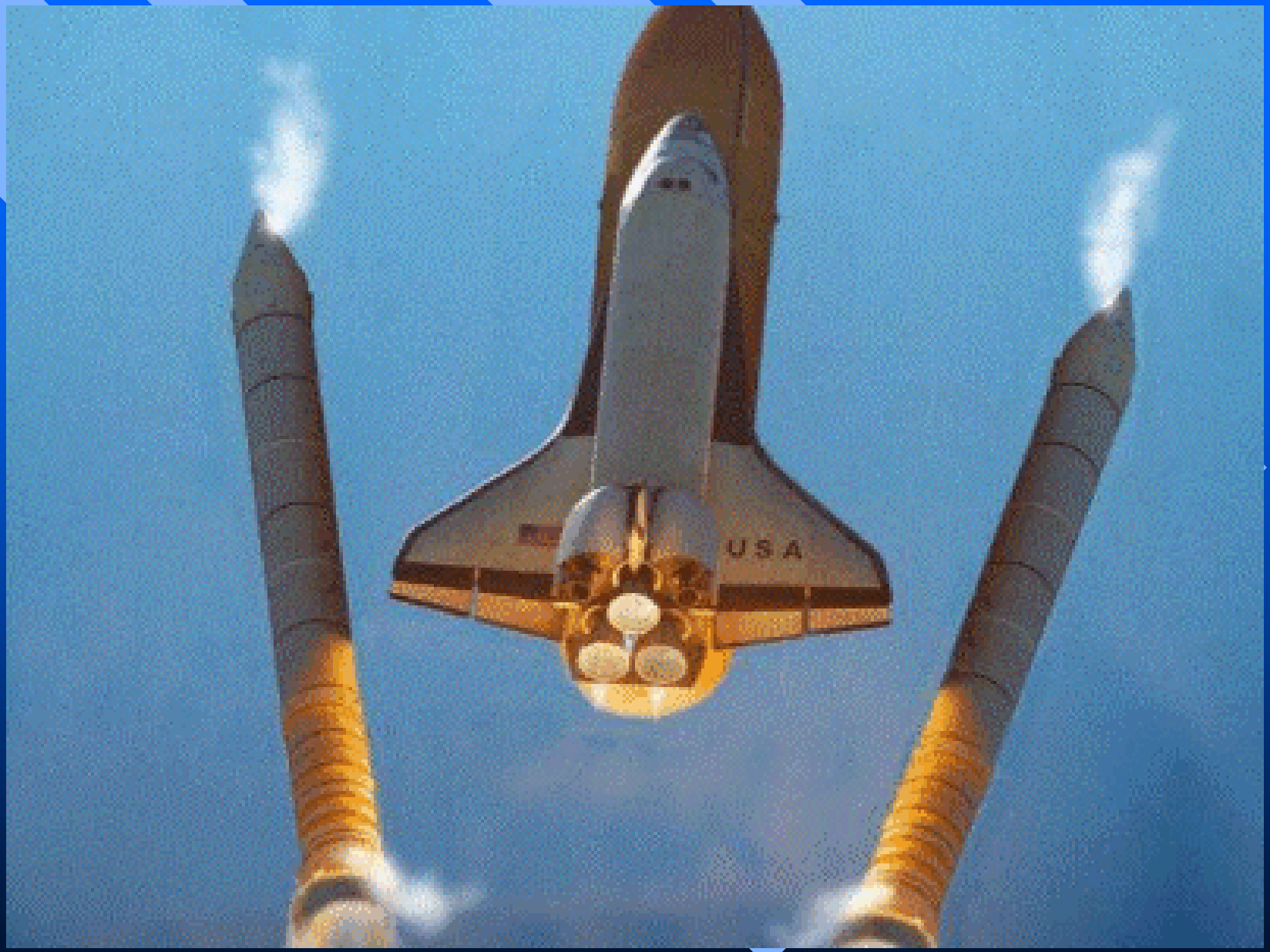
Prelaunch Operations Timeline

- Installation through L-30 min nominal ops
  - L-88 hours complete Top-off SFHe activities
  - Approximately 650 W for J-Crate, Cryo valves, Cryo coolers, CAB critical functions, and SFHe Tank vent pump
  - Maximum of 2 kW for calibration and contingency should be completed prior to L-TBD days
- At L-30 minutes
  - Close SFHe Tank Vent Valve and deactivate Vent Pump
  - Deactivate Cryo coolers
  - Power down all equipment with the exception of J-Crate and necessary CAB functions to monitor of cryo system health (limited to 120W)
- Monitor health status of cryo systems till L-9 min; GO/NO GO Call from AMS based on Cryo System Health (monitoring will continue until T0 disconnect)

Launch, T0 disconnect (loss of 1553/power)

Ascent Operations Requirements

- SFHe Tank Nominal Vent Valve operation
  - Barometric switch to open valve when PLB pressure is less than the SFHe
  - Time-tagged command via Backup Flight System (BFS) General Purpose Computer (GPC) to open as backup @ L+ TBD min
  - 28Vdc momentary power for valve opening and 5Vdc discrete for command
  - In the event of an abort barometric switch will close vent valve during descent
  - Any potential ignition sources will be compliant with NS2/81-M082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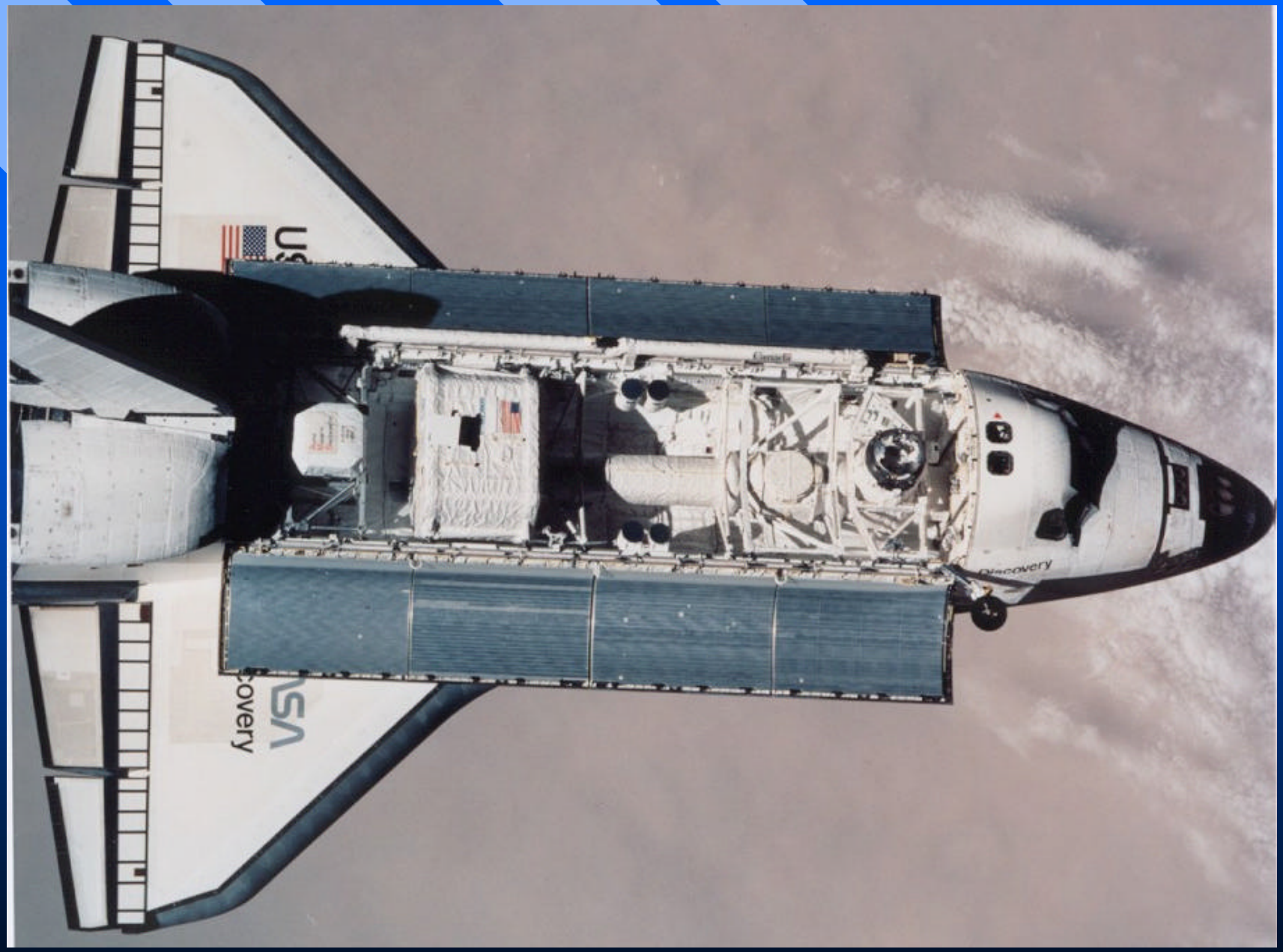
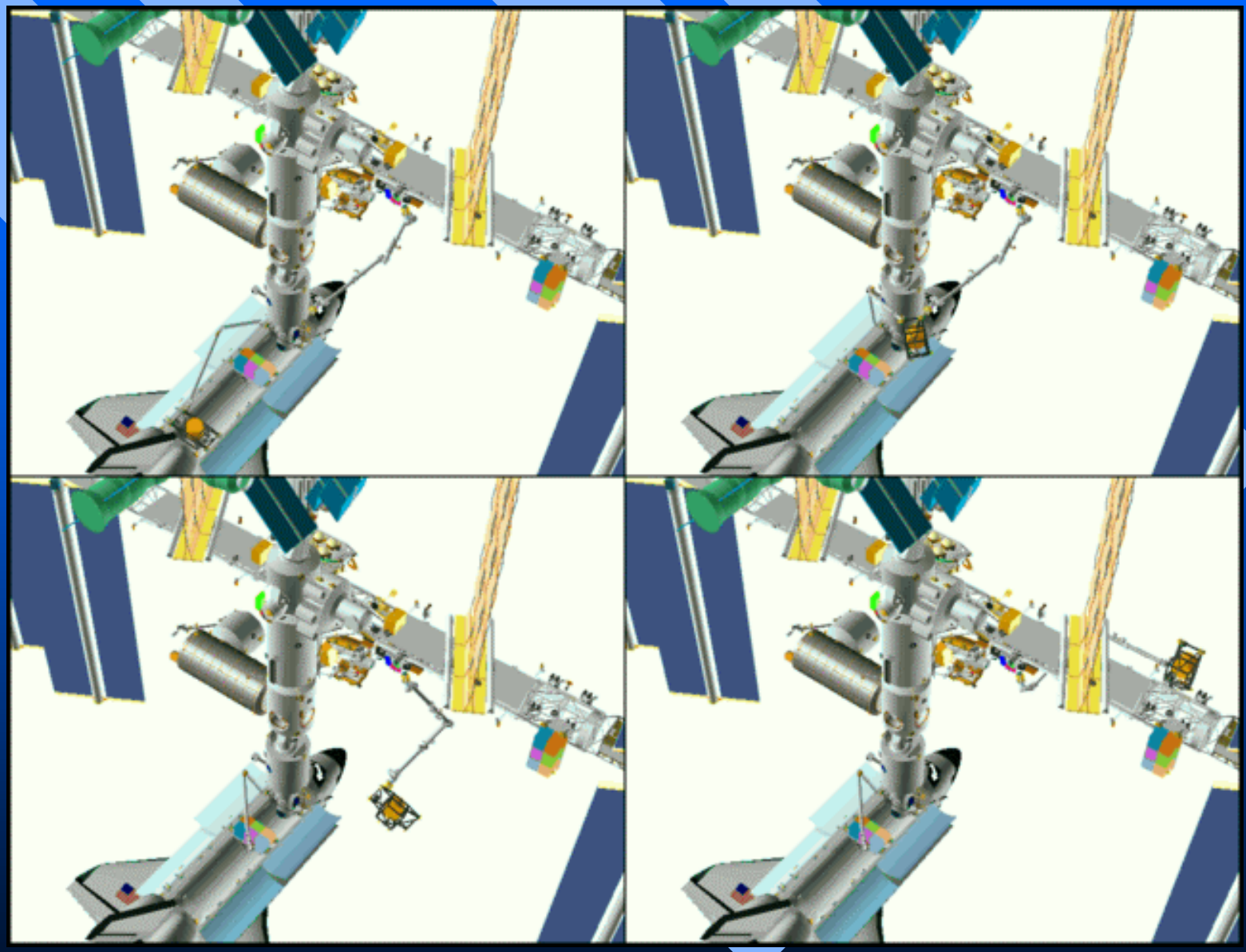

Discovery

On-Orbit STS Operations Profile

- Unstow and activate Digital Data Recorder System-02 (DDRS-02)
- Activate Assembly Power Converter Unit (APCU)s, Cryocoolers, and Housekeeping data at approx. Mission Elapsed Time (MET) 2 hr 30 min
- Activate/checkout AMS avionics subsystems and thermally condition payload
- Maximum power draw on shuttle 2 kW
- No magnet charging on STS
- Dock with ISS (MET Day 3)
- GO/NO GO Call prior to transfer on MET day 4 based on AMS Health; Power down AMS just prior to transfer operations
- Grapple Flight Releasable Grapple Fixture (FRGF) with Shuttle Remote Manipulator System (SRMS)
- Disconnect Remotely Operated Electrical Umbilical (ROEU) and operate Payload Retention Latch Actuators (PRLAs)
- AMS removed from PLB by SRMS

Grapple AMS FRGF w/ SRMS, activate PRLAs

Handoff to SSRMS (grapple PVGF)

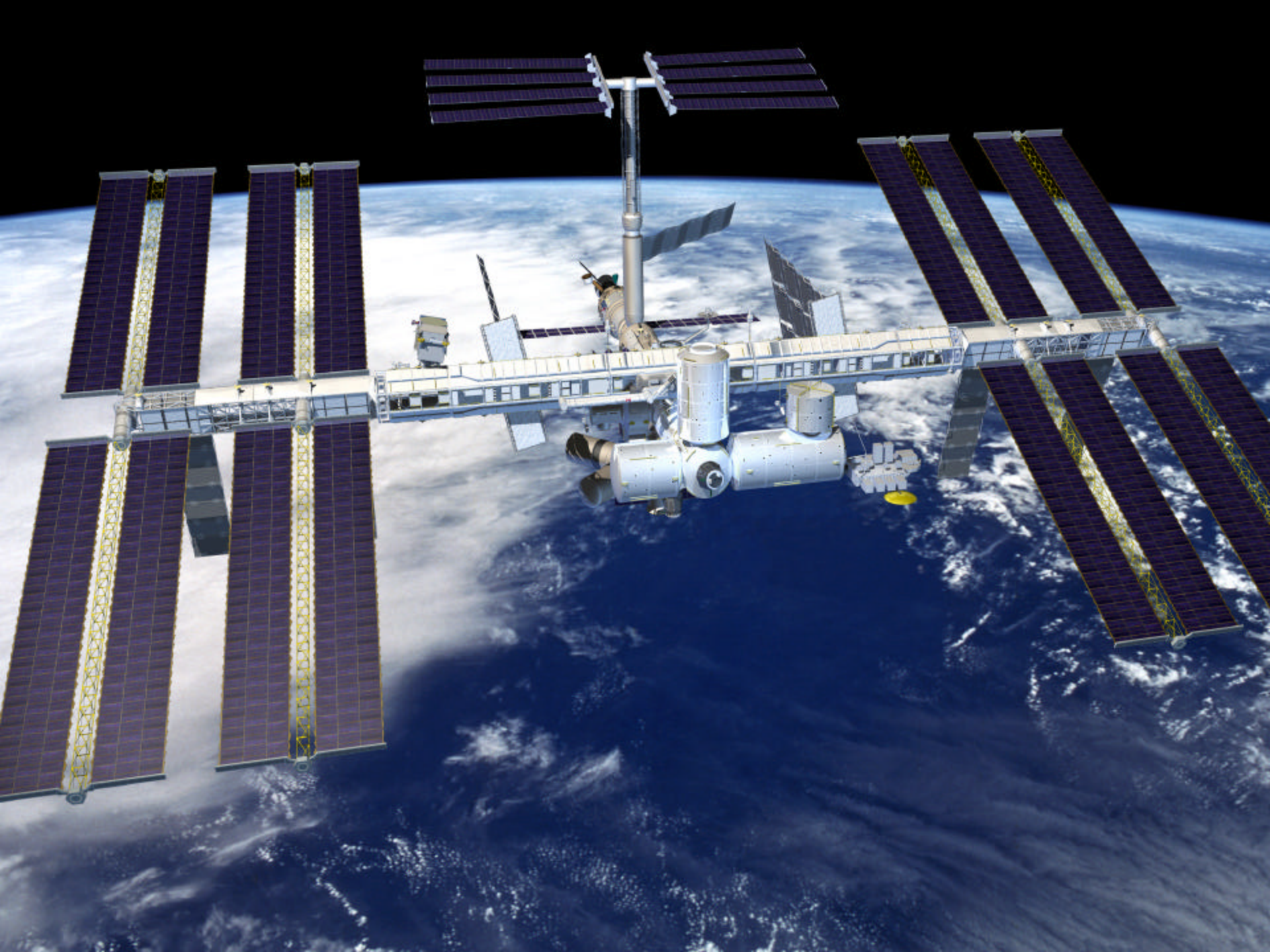


Maneuver SSRMS toward S3 Truss

SSRMS moves AMS to PAS w/ EBCS viewing

On-Orbit ISS Operations Profile

- Grapple Power and Video Grapple Fixture (PVGF) with Space Station RMS
  - External Berthing Cues System (EBCS) utilized to verify final approach to Attach Site (Power and Video functions routed through SSRMS)
  - SSRMS supplies power for AMS Heaters during Transfer Ops (maximum 1.8kW available through PVGF)
- SRMS release of AMS
- Transfer to S3 attach site
- Attach AMS to S3 upper inboard site mechanical/ electrical (via PAS & UMA)
- Deactivate power via PVGF and activate power via UMA



On-Orbit ISS Operations Profile (Cont.)

- Power up Avionics (note: ACOP powered up and checked out prior to arrival)
- Perform abbreviated avionics checkout
- SSRMS Ungrapple
- Begin magnet charging operations (w/ crew monitoring)
- Once Magnet charging operation complete; 3 to 5 years operation with magnet, continue with other physics goals
- Stay/No Stay Call from AMS should be performed as late as possible prior to STS undock from ISS
- Primary control of AMS is from ground
- Crew interfaces to AMS via Express Rack Laptop through ACOP